Last Lecture Summary

- **Definition of Relational Model**
- **Concepts : relations**

  instance

  schema

  cardinality

  degree
- **Advantages and Disadvantages**

Components

➢ The relational model consists of three major components

➢ The set of relations and set of domains that defines the way data can be represented (data structure)

➢ Integrity rules that define the procedure to protect the data (data integrity)

➢ The operations that can be performed on data (data manipulation)

Codd's Rule

➢ Dr. Edgar Frank Codd was a computer scientist while working for IBM he invented the relational model for database management.

➢ Codd proposed thirteen rules (numbered zero to twelve) and said that if a Database Management System meets these rules, it can be called as a Relational Database Management System.

➢ These rules are called as Codd's12 rules.

➢ Hardly any commercial product follows all.

Codd's Rule Cont..

➢ Rule 0 : Foundation Rule

➢ Rule 1: Information Rule

➢ Rule 2: Guaranteed Access Rule

➢ Rule 3: Systematic Treatment of NULL Values

➢ Rule 4: Active Online Catalog

➢ Rule 5: Powerful and Well-Structured Language

➢ Rule 6: View Updating Rule

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Codd's Rule Cont..

➤ Rule 7: High-Level Insert, Update, and Delete Rule

➤ Rule 8: Physical Data Independence

➤ Rule 9: Logical Data Independence

➤ Rule 10: Integrity Independence

➤ Rule 11: Distribution Independence

➤ Rule 12: Non-Subversion Rule

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Relational Integrity

● Integrity Constraint is a mechanism to prevent invalid data entry into table to maintain the data consistency.

● Mainly used to provide security and consistency to the database in various operations.

● Types of constraints

➢ Domain Integrity Constraint

➢ Entity Integrity Constraint

➢ Referential Integrity Constraint

➢ Enterprise Constraint

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Domain Integrity Constraint

● The domain constraint are considered as the most basic form of integrity constraints.

● Domain integrity means it is the collection of valid set of values for an attribute.

● Constraints -

➢ Not Null

➢ Unique

➢ Default

➢ Check

Entity Integrity Constraint

Primary Key Constraint –

➢ It uniquely identify each record in a table

➢ It does not allow NULL and duplicate values

➢ Combination of Not Null and Unique

SID	Name	Class (semester)	Age
8001	Ankit	1st	19
8002	Srishti	1st	18
8003	Somvir	4th	22
8004	Sourabh	6th	45
8002	Tony	5th	23

Not allowed as Primary Key Values must be unique

● A relation/table can have only one primary key, which may consist of single or multiple fields.

Referential Integrity Constraint

Foreign Key

➢ A foreign key is an identifier in a table that matches the primary key of a different table.

➢ The foreign key creates the relationship with a different table, and referential integrity refers to the relationship between these tables.

➢ It ensures the relationships between tables in a database remain accurate by applying constraints to prevent users or applications from entering inaccurate data or pointing to data that doesn't exist.

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Referential Integrity Constraint

For referential integrity to hold in a relational database, any column in a base table that is declared a foreign key can contain either a null value, or only values from a parent table's primary key.

tblPerson			
ID	Name	Email	GenderID
1	Jade	j@j.com	2
2	Mary	m@m.com	3
3	Martin	ma@ma.com	1
4	Rob	r@r.com	NULL
5	May	may@may.com	2
6	Kristy	k@k.com	NULL

tblGender	
ID	Gender
1	Male
2	Female
3	Unknown

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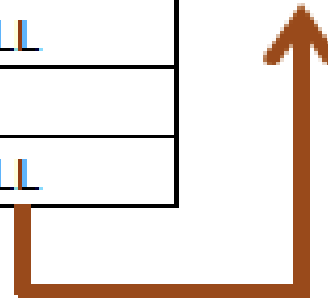
Enterprise Constraint

➤ It is also referred as Semantic Constraints.

➤ They are additional rules specified by users or database administrators.

➤ These rules are depending upon the requirements and constraints of the business for which the database system is being maintained.

➤ eg. A class can have maximum 30 students

➤ eg. A teacher can teach maximum 2 subject a semester

➤ eg. A employee can work on max 5 projects at a time